International Journal of Computer Science Engineering and Information Technology Research (IJCSEITR)
ISSN(P): 2249-6831; ISSN(E): 2249-7943
Vol. 5, Issue 2, Apr 2015, 103-112

PREVENTION OF PHYSICAL DISABILITIES THROUGH ORI TECHNIQUE

ASHISH GUWALANI [1], A. K. DUBEY[2] & RAKESH RATHI[3]

[1]M.Tech Student, Jagannath University Jaipur in Rajasthan, India

[2]Government Engineering College, Ajmer, Rajasthan, India

[3]Assistant Professor, Department of CS & IT, Rajasthan, India

ABSTRACT

Surface interface has made more effective impression in the processes and applications of interfacing technology. The human computer interface plays an important role in Surface computing. It provides a very sophisticated method for communication and interaction between user and system. The touchable devices used for tap, zooming, scrolling and other operations which have perform on touchable devices it may rise the symptoms of physical disability for next generation of people. The human organs affected through the maximum application of such devices. We evaluate the adoptability of touchable devices and the impact of radiations through prolonged use of these devices. The radiations produced by touch screen may give rise to various physical disabilities for next generation such as dorsiflexion disease. Author proposed ORI (Optimized Radiation Impact) technique and designed a prototype model to control and reduce the radiations produced by touchable devices. We have designed a model in which, we reduce the active area of touchable device to protect our organs from harmful radiations.

KEYWORDS: Surface Computing, Multitouch, GUI (Graphical User Interface), Radiation, ORI Techniques

INTRODUCTION

The rapidly developing world of the multi-touch and surface computing has produced some new possibilities in the interaction between user and technology [1]. Surface Interface has deployed into the commercial field in past decades. Surface interface is one of the most sophisticated and user friendly interface which helps users to interact with the system in effective manner. Surface interface provides a real time environment to work with any system. For this various interface technology has been designed to improve the quality of interaction. They have provided an easier way to interact with the technology in a short period of time. Through the invention of the Elograph, by Elographics, Inc, touch screen technology entered the public eye in 1971 [3]. User interfaces supports a wide range of tasks and provide many necessary features that are needed by various processes. In user interfaces to achieve high accuracy expert typists have long been touch typing, that is, typing without frequently looking at the keys. Ten-finger touchscreen keyboards, in comparison, have not yet been able to match the performance of traditional physical keyboards [4].

Surface Interface

In the current scenario human computer interaction, Graphical User Interface becomes a key feature and for the improvement of interaction, systems are designed in such a way that it seems & behave much like the physical world. Surface interface has provided the environment in which user can easily interact with various smart applications. Surface interface becomes an emerging technology which is adopted by different commercial industries. Now a new technology

known as multi-touch has introduced some new innovations in the interaction between user and smart phone through which we can access multiple objects at same time.

Definition

"Surface interface is a type of user interface which relies on the array of sensors which are arranged in horizontal, vertical or spherical manner to provide us more sophisticated human computer interface."

Touch Panels

A touch panel is a piece of equipment that allows users to interact and communicate with a computer by performing tap, scroll and other operations over the screen. Touch panels have integrated themselves in every aspect of our daily life. Touch panels are used in various applications like gaming, multimedia, ATM, Smartphone's, puzzles etc. In touch panels the input is detected by the sensors by sensing the contact point at which the user has produced impact either by finger or stylus.

Resistive Touch Panels

Touch panels based on resistive method are called pressure-sensitive or analog-resistive film touch panels. In this method position on screen is detected by change in the pressure. When we touch on screen by using finger, stylus or any other object the position of contact is detected by change in the pressure. In resistive touch panels a glass screen or a film screen separated by a narrow gap and both of this layer attached by transparent electrode film. Pressing the top surface of the screen presses the electrodes in the film, which results the flow of electrical current. The point of contact is recognized by detecting the change in voltage.

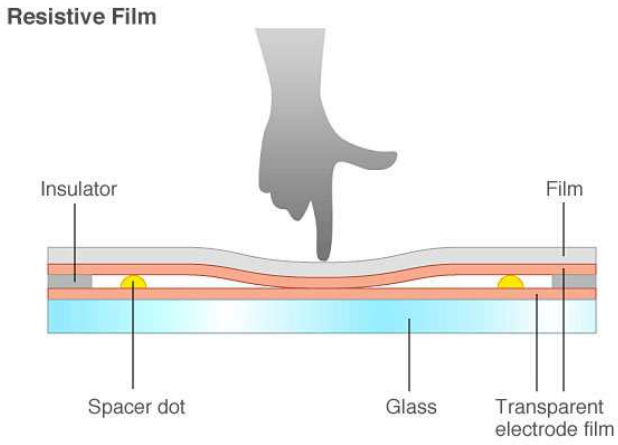

Figure 1: Resistive Film

Capacitive Touch Panels

Capacitive touch panels are often used for large panels. In this panel, a transparent electrode film is placed at top of a glass substrate, covered by a protective cover. Inside the panel Electric voltage is applied to electrodes positioned at the four corners of the glass substrate. Now these electrodes generate a uniform electrical field of low-voltage across the entire panel. The position at which the finger touches the screen is recognized by measuring the resulting changes in electrostatic capacity. The change in the electrostatic capacity is detected by at the four corners of this touch panel.

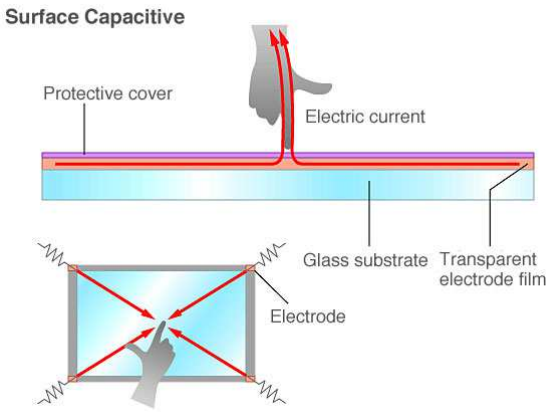

Figure 2: Capacitive Panel

Multi Touch Surface

A multi-touch surface allows a device to recognize two or more simultaneous touches by more than one user. Some have the ability to recognize objects by distinguishing the difference in pressure and temperature of what is placed on the surface. Depending on the size and different applications installed in the surface, two or more people can perform different types of applications on the device. Multi-touch computing is the direct manipulation of virtual objects, pages, and images allowing you to swipe, pad, knuckle, pinch, grab, rotate, type, and to command them by eliminating the need for a keyboard and a mouse. Everything can be done with our fingers.

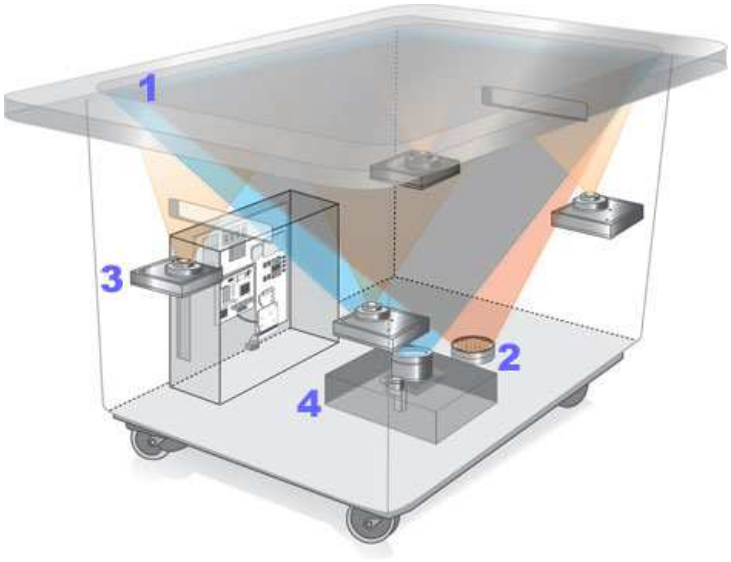

Figure 3: Architecture of Microsoft Surface Table

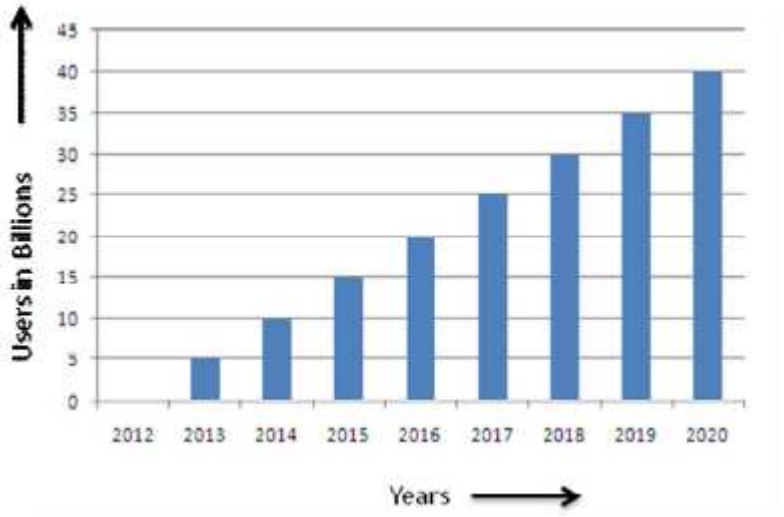

Figure 4: Adoptability of Touch Screen Devices

LITERATURE REVIEW

The history of user interfaces starts from punch-card in 19th century through typed commands to the advanced technology like user friendly touchable GUI's of today. The Information technology becomes more powerful after the innovative idea of HCI. The involvance of touchable device motivates inventors and designers to work in surface interfaces for interaction of human with computer. Initially Win dow based graphical user interface was developed for a particular system but later it becomes the most innovative GUI for the other technologies. Windowing environment has provide us a method in which we can interact with system using single focal point, but now a new technology known as multi-touch has introduced with some new innovations in the interaction between user and smart phone through which we can access multiple objects at same time. The procedure of contextual application into smart phone required unwanted time to perform the application. Create the platform for user to define the short key word to open an application and reduce the unwanted time required to complete the operation of contextual application into smart phone. [2] Touch screen technology has been invented around 1970's.The touch sensors are conductive surfaces on the exterior of the device shell that are applied using conductive paint which is connected internally to the touch sensing circuitry present in the device.[4] The first Multitouch equipment was developed by Mr. Bob Boie at Bell Labs. In this project he uses an array of touch sensors laid on CRT screen. When a human body touch this screen then uniform charge maintained in the device is released at the position where human touch that screen and that disturbed area can be detected. The rapid development of surface computing has provided opportunity for new possibilities of interaction paradigms such as Multi-Touch technology. By learning from previous experience, developers are inventing novel steps to interact with technology. [5]

PROBLEM DISCUSSION

In tablets & smart phones whenever we try to access any application or object by various operations like tap, zooming or scrolling some radiations are produced. A uniform charge is maintained in capacitive touchable screen when we click on screen that uniform charge gets disturbed and this charge released at the point of contact. So in this process when we give input to the surface it produces output and some radiations.

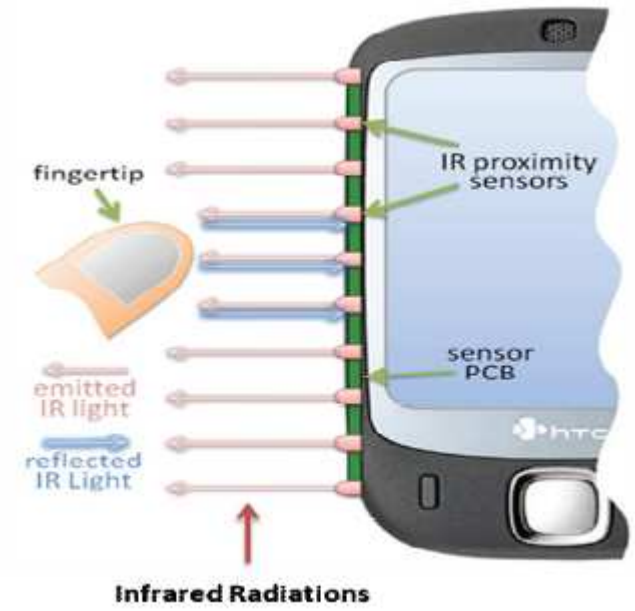

Figure 5: Radiations Produced by Surface of Smartphone

These radiations penetrate into out body organs such as if we are using our finger to give input at the point of contact radiations enters into our finger. This leads to an unnatural bending of the human organs, these radiations affects the bones of our body, produces muscle strain and some other harmful disease. The major problem which is caused by these radiations is called dorsiflexion. In this problem our organs are converted into some unnatural shapes. [9]

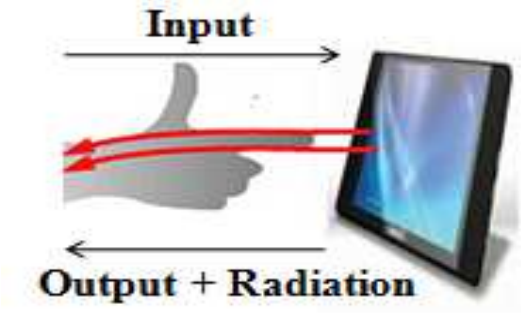

Figure 6: Interaction with Touchable Screens

PROPOSED SOLUTION

We have designed a prototype model to eliminate the effect of radiation. In this model the radiations which cause the dorsiflexion problem in human can be avoided by deactivating the unused area of surface. In this model when we want to give input either by using finger or stylus it activates only the nearby area of that position and the remaining area is deactivated. As we can see in this image a person is try to give input on the surface and only nearby area of that point of impact will get activated and the remaining will get inactive.

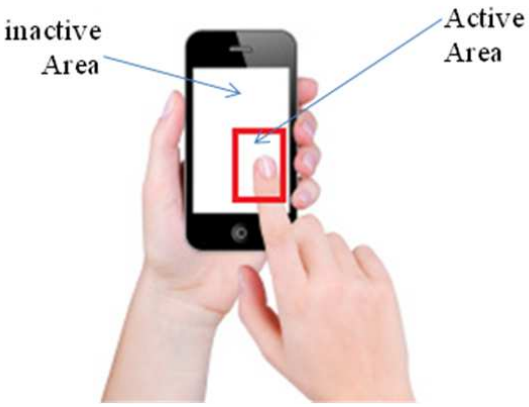

Figure 7: Active and Inactive Area

SIMULATION RESULTS

In the simulation process we have designed an ORI radiation model in inkscape simulator. In ORI radiation model we have maintained a uniform charge over the surface screen. This screen contains many sensors through which input can be recognized.

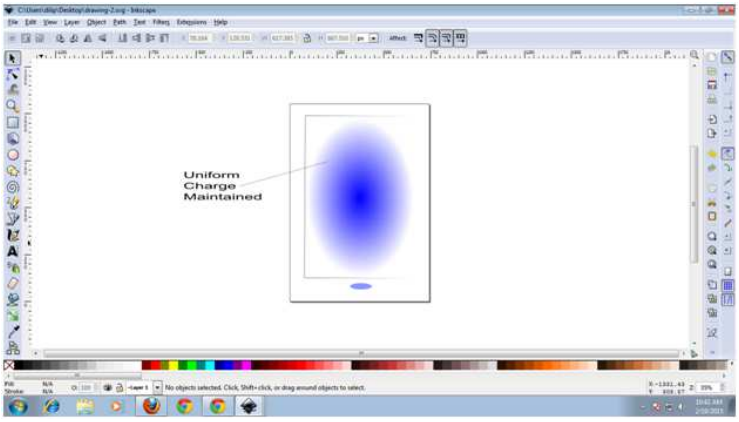

Figure 8: Simulated Smart Surface

Now when an actor gives input on smarthphone then the point of contact at the surface is detected and the charge will released at that point. This charge produce negative impact over our muscles and cause dorsiflexion problem. In this step the radiations of whole surface penetrates into actors finger which causes a disaster impact so we have to reduce this radiation to do so we have reduced the active area of our surface during that impact.

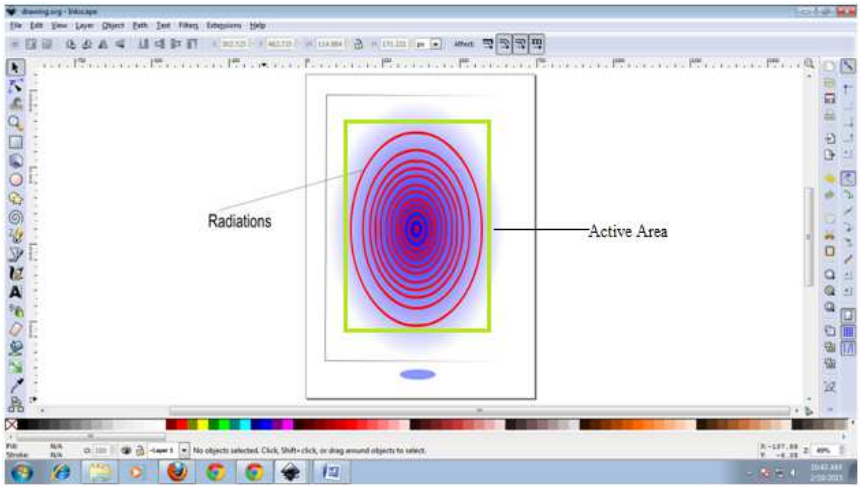

Figure 9: Active Area During the Impact in Traditional Approach

When an actor try to give input to surface either by using finger or stylus this model activates only the nearby area of that position and the remaining area is deactivated. So the radiations produced by only that active area and remaining area does not affect our organs. To calculate the size of active area we have proposed a formula through which the amount of harmful radiations can be reduced.

In this formula we have define the radius of active area as $1/4^{th}$ of the diagonal length of the screen. By this proposed model we can reduce the harmful radiations and this will reduce the probability of harmful disease which will generate by these harmful radiations.

$R= D/4$

Where R is the radius of active area and D is the diagonal distance of the surface screen.

So when an actor interacts with the surface the radius of the active area is calculated by the diagonal distance of the system screen. The length of the radius will be taken as one fourth of the diagonal distance. Now the circle made by this active area remains activated during the operation while the other portion of the surface will become inactive. This will increase the energy efficiency of the screen and the fear of dorsiflexion problem gets reduced by this methodology.

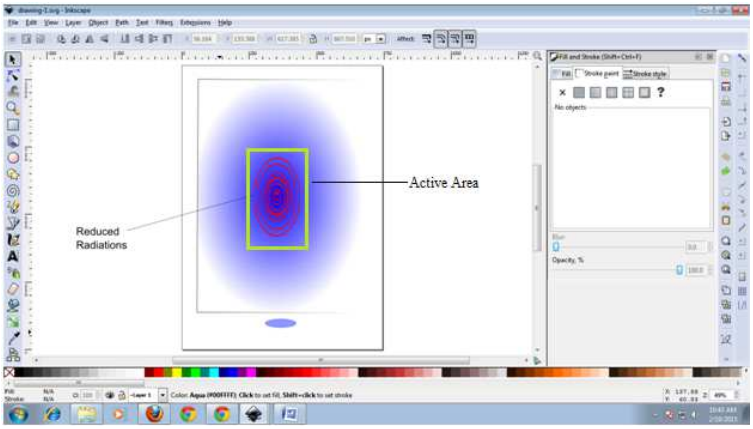

Figure 10: Active Area During The Impact In ORI Model

RESEARCH METHODOLOGY

The author has used quantitative approach to reduce the radiations effects that is generated via newton's action reaction law over the applications of surface interface. The Context of surface area may remain for the application purpose but a method is derived to declare the active and inactive mode of sensors that is configured on surface panel, during the dynamic application once the most nearby sensors gets activated for taking the command while the remaining surface sensors over the surface panel becomes inactivated. This approach is suitable into the design process of mobile surface panel and it will increase the usability in the market there for industry must follow and deploy such type of system for maximum production.

CONCLUSIONS

The automation of technology is the next generation for future interaction to support our routines of daily life with consult to their natural behavior and sometimes modifications as artificial. To concern such a parameter big industries are investing to deploy the work on surface interface. They have released lot of fund to enhance the quality matrix for work application and inviting the researcher to do the research in this era. As the everything into the environment has pros and cons, automations may have the same. Author focused on con behaviors such a surface automation tech that have continuing developed and produced by production industries and author highlighted the radiation effect on human body due to the application of such surface interface technology. Author have given a novel contributions to reduce the radiation impact affected during the applications of surface device proposed prototype are more applicable for safety purpose and prevent the human life from physical disabilities.

REFERENCES

1. Guwalani A., Saxena R, Dubey A.K & Rathi R, "Hypothesize the touchable impact: Cause and control the radiation effect", IEEE Xplorer ISBN- 978-1-4799-3139-2 presented at ICSPCT 12-13 July 2014.
2. Anil Kumar Dubey, Ashish Guwalani, Rohit Saxena, Khushbu Gulabani, Rakesh Rathi, " Surface Interface for User Friendliness: Quicker Method & Smart Procedure for Enhancing Mobile Phone Applications", ISSN 0973-7529; ISBN 978-93-80544-15-1 presented at INDIACom 11th – 13th March, 2015.
3. Timothy Hoy and Joseph Kozak,"Touch Screens: A Pressing Technology", Tenth Annual Freshman Conference, April 10, 2010, University Of Pittsburgh.
4. U. Hinrichs, M. Hancock, C. Collins, and S. Carpendale. Examination of text-entry methods for tabletop displays. In Proceedings of Tabletop '07, pages 105–112. IEEE Computer Society, 2007.
5. Alex Butler, Shahram Izadi, Steve Hodges, SideSight: Multi-"touch"interaction around small devices, Microsoft Research, Cambridge, UK.
6. Chris North, Tim Dwyer, Bongshin Lee, Danyel Fisher, Petra Isenberg,George Robertson, and Kori Inkpen, "Understanding Multi-touch Manipulation for Surface Computing", T. Gross et al. (Eds.):INTERACT 2009, Part II, LNCS 5727, pp. 236–249, 2009. © IFIP
7. David S. Kirk, Shahram Izadi, Otmar Hilliges, Stuart Taylor, AbigailSellen, Richard Banks, "At Home with Surface Computing?", CHI'12,May 5–10, 2012, Austin, Texas, USA. Copyright 2012 ACM 978-1-4503-1015-

4/12/05.

8. Jacob O. Wobbrock & Meredith Ringel Morris, Andrew D. Wilson,"User-Defined Gestures for Surface Computing", CHI 2009, April 4–9,2009, Boston, Massachusetts, USA.Copyright 2009 ACM 978-1-60558-246-7/09/04.
9. Rajesh C, Muneshwara M.S, Anand R, Bharathi R, Anil G.N., "Surface Computing: A Multi Touch Technology (MTT)- Hands on an Interactive 3D Table ",International Conference on Computing and Control Engineering (ICCCE 2012), 12 & 13 April, 2012, ISBN 978-1-4675-2248-9 © 2012 Published by Coimbatore Institute of Information Technology.
10. Ken Hinckley and Mike Sinclair, Touch-Sensing Input Devices,Microsoft Research, One Microsoft Way, Redmond.
11. Anne Marie Piper, Ross Campbell, James D. Hollan, "Exploring the Accessibility and Appeal of Surface Computing for Older Adult Health Care Support", CHI 2010, April 10-15, 2010, Atlanta, Georgia, USA, Copyright 2010 ACM 978-1-60558-929-9/10/04.
12. www.talyst.com
13. www.infoworld.com
14. www.elotouchsolutions.com
15. www.IDTechEx.com